

External Technical Review Summary

United States Department of Energy Office of Environmental Management (DOE-EM)

External Technical Review of the ARROW-PAK Container

Why DOE-EM Did This Review



The Waste Isolation Pilot Plant (WIPP) facility, located in New Mexico, is the first and only operating U.S. deep geologic repository designed for the permanent disposal of defense-related transuranic (TRU) waste. The WIPP facility provides underground disposal in a 2,000-foot-thick (610-meter) stable salt formation. Some of the waste destined for WIPP cannot be shipped in the existing approved shipping containers because it has the potential to generate hydrogen gas that exceeds the limits set by the Nuclear Regulatory Commission (NRC). The ARROW-PAK container was designed to provide a payload container for high-wattage contact handled (CH) TRU waste. The ARROW-PAK is designed to hold one high-wattage CH-TRU waste 55-gallon drum and to withstand any hydrogen deflagration event. Once loaded and sealed, three ARROW-PAK containers would be placed into one TRUPACT-II for shipment to WIPP. The ARROW-PAK and contents would be emplaced in the repository intact. *The external review objective was to evaluate (1) the technical design of the ARROW-PAK container and its potential for certification and (2) the programmatic need and the TRU inventory appropriate for the ARROW-PAK.*

What the ETR Team Recommended

- To increase the probability of success, DOE should revise the safety analysis report addendum to include better performing materials in a redesigned ARROW-PAK, consider treating ARROW-PAK as a secondary

containment system instead of a payload container, and demonstrate that it has a very low probability of failure during transportation, and that even if it fails, the consequence would be minimal due to the primary container boundary of the TRUPACT-II.

- Provide sufficient testing and safety documentation to fully address the NRC's requests for additional information (RAI) and the relevant regulations.
- A redesigned ARROW-PAK made of the alternate polyethylene material would allow an additional 120m³ to be shipped, increasing the total to 160m³.

What the ETR Team Found

The ETR Team concluded that the current approach for the ARROW-PAK container does not have a high probability for successful certification by the NRC because the NRC concerns are significant and the DOE has not addressed concerns in key areas such as applicable design and inspection codes, cold temperature behavior of fuse joints, drop test orientations, and deflagration testing pressure and temperature. The recommendations provided by the ETR would significantly improve the potential for certification. The recommendations key on complete responsiveness to the NRC's RAI and demonstrating that a redesigned ARROW-PAK meets regulatory requirements. A significant good practice noted by the ETR is that the revisions to the TRUPACT-II SAR over the last five years have increased the TRU inventory available for shipment in the TRUPACT-II thereby reducing the TRU inventory requiring the ARROW-PAK capability. The ARROW-PAK would address up to 160m³ of the existing inventory that is not currently shippable.

To view the full ETR reports, please visit this web site:
<http://www.em.doe.gov/Pages/ExternalTechReviews.aspx>

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The purpose of an External Technical Review (ETR) is to reduce technical risk and uncertainty. ETRs provide pertinent information for DOE-EM to assess technical risk associated with projects and develop strategies for reducing the technical risk and to provide technical information needed to support critical project decisions. Technical risk reduction increases the probability of successful implementation of technical scope. In general, ETRs assesses technical bases, technology development, and technical risk identification and handling strategies.



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